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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/076,135	02/14/2002	Seth R. Stern	100/11020	8863

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EXAMINER	
BARTON, JEFFREY THOMAS	
ART UNIT	**PAPER NUMBER**
1795	

MAIL DATE	DELIVERY MODE
01/10/2008	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/076,135	STERN ET AL.	
	Examiner	Art Unit	
	Jeffrey T. Barton	1795	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *23 August 2007*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-3,7-11 and 13-20* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-3, 7-11 and 13-20* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *20050103*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Response to Amendment

1. The amendment filed on 23 August 2007 does not place the application in condition for allowance.

Status of Rejections Pending Since the Office Action of 30 September 2005

2. All previous rejections are withdrawn due to Applicant's amendment.

Oath/Declaration

3. It is noted that in response to the Notice to File Missing Parts of Nonprovisional Application sent on 02 April 2002, Applicant sent correspondence received 20 May 2002. The transmittal form entered into the file indicates that a declaration was included with this correspondence, but the declaration was not scanned into the file. The Examiner requests that Applicant kindly include another copy of this executed declaration with the next correspondence, and apologizes for this apparent error.

Claim Rejections - 35 USC § 102

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

5. Claims 1-3 are rejected under 35 U.S.C. 102(e) as being anticipated by Becker et al. (US 6,641,708)

Addressing claim 1, Becker et al disclose a method of applying an electrical current through a fluid-containing cavity comprising: providing a fluid-containing cavity (Figure 39; Spacer defines cavity); contacting two electrodes with the fluid in the cavity, both electrodes having a relevant surface area in contact with the fluid (Column 66, line 51 - Column 67, line 40); applying an alternating current from a current source to the fluid via these two electrodes (Column 67, lines 10-40); wherein the frequency and relevant surface area are selected to avoid generation of gas bubbles at either electrode (Column 4, lines 57-67; Column 16, lines 17-58; Column 49, lines 50-53; Column 67, lines 15-18) As can be seen in Figure 39, interdigitated finger electrodes are present in tapering sections at either end of the fluid containing cavity defined by the spacer. In this system, a finger electrode in the central widest section of the cavity reads on a first electrode in a first portion of the cavity that is wider than a second portion, while a finger electrode of the opposite polarity disposed in the tapering portion reads on a second electrode that is separated from the first, widest portion of the cavity by a second portion of the cavity, i.e. the tapering section. These finger electrodes are parallel to each other (Figure 39), therefore along the edges that face each other, they are configured to provide substantially uniform current distribution.

Regarding claims 2 and 3, Becker et al disclose using AC frequencies of 10 kHz. (Column 67, lines 15-18)

6. Claims 13, 17, 18, and 20 are rejected under 35 U.S.C. 102(b) as being anticipated by Chow et al. (WO 99/12016)

Regarding claims 13 and 20, Chow et al disclose a method for applying electrical current through a fluid containing cavity (Figure 2) comprising: providing a fluid-containing cavity (Figure 2; region 407); providing first, second, and third electrodes (e.g. 427/415/429 or 415/427/417) in electrical contact with the fluid in the fluid containing cavity at different points as claimed, the second point being between the first and third points; simultaneously applying a first current between the first electrode and the second electrode and a second current between the second electrode and the third electrode as claimed (Page 21, line 13 - Page 23, line 14; particularly page 23, lines 3-5), wherein at least one of the electrodes is in contact with region 407 via a fluid-filled channel, the electrode being disposed in contact with the fluid in the fluid filled channel. (Figure 2; electrodes 427 and 429 contact fluid in channel 421, electrodes 415 and 417 contact fluid in channel 413) Note that at page 23, lines 3-5, Chow et al discuss simultaneous application of a voltage between regions 409 and 411 (i.e. via electrodes 415 and 417) and an alternating voltage through channel 421 (i.e. via electrodes 427 and 429). All four electrodes are in contact with electrolyte present throughout the system. With electrodes 415 and 417 therefore held at fixed potentials, while an alternating voltage is applied to at least one of electrodes 427 and 429, the current

application limitations will be met, since current will flow between any electrodes that are held at different potentials at any point in time.

Regarding claims 17-18, Chow et al disclose exemplary microchannels of 5 mm length, which would give electrode separation as claimed. (Page 47, lines 28-30)

Claim Rejections - 35 USC § 103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

8. The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

9. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to

consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

10. Claims 7-11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Becker et al. (US 6,641,708)

Becker et al disclose a method as described above in addressing claims 1-3.

In the embodiment of Figure 39, Becker et al do not explicitly disclose a curved first edge of the first electrode as claimed in claim 7, nor do they explicitly disclose the first and second electrodes being disposed on opposing surfaces of the cavity.

Regarding claim 7, Becker et al suggest using polynomial electrodes, which have curved surfaces. (Column 4, lines 57-67)

Regarding claims 8-11, Becker et al suggest placing facing interdigitated electrode arrays on opposite sides of the fluid containing cavity (e.g. Figure 2D; Column 5, lines 6-9), and that the preferred distance between the walls on which the opposing electrodes are disposed is between 20 and 600 microns. (Column 16, lines 1-5)

Regarding claim 7, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the electrode array of Figure 39 of Becker et al by replacing the interdigitated electrodes with polynomial electrodes, as suggested by Becker et al, because Becker et al indicates that such electrode shapes are useful in the electrode arrays of their invention. (Column 4, lines 57-67)

Regarding claims 8-11, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the system of Figure 39 of Becker et al by providing an opposing interdigitated electrode array on the top wall of the

chamber, as suggested by Becker et al, because Becker et al teach that such opposing electrode arrays are useful in their invention. (Figure 2D; Column 5, lines 6-9)

11. Claims 14-16 and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chow et al. (WO 99/12016)

Chow et al disclose methods as described above in addressing claims 13, 17, 18, and 20. Chow et al disclose microchannel lengths of 5 mm (Page 47, lines 29-31), selection of appropriate voltages based on heating requirements (Page 23, lines 5-6; Page 38, lines 11-13), and selection of conductivity/resistivity of the electrolyte within the system. (Page 41, lines 4-29)

Chow et al do not explicitly disclose maintaining the applied voltages below 1000V, any specific resistance value between any two electrodes, or electrodes spaces less than 5 mm apart.

Regarding claim 14, it is the Examiner's position that selection of a voltage less than 1000V would have been obvious to one having ordinary skill in the art, dependent upon the heating and electrokinetic requirements of a given experiment. Selection of an appropriate voltage is considered within the level of ordinary skill in the art, in the absence of evidence of criticality.

Regarding claims 15 and 16, it is the Examiner's position that resistances within the claimed range would have been obviously present within the method of Chow et al, depending on selected channel lengths and buffer concentration selected according to the disclosure of Chow et al.

Regarding claim 19, it is the Examiner's position that selection of channel length, and therefore distance between respective electrodes is a matter of system design choice to one having ordinary skill in the art. Note that in *Gardner v. TEC Systems, Inc.*, 725 F.2d 1338, 220 USPQ 777 (Fed. Cir. 1984), *cert. denied*, 469 U.S. 830, 225 USPQ 232 (1984), the Federal Circuit held that, where the only difference between the prior art and the claims was a recitation of relative dimensions of the claimed device and a device having the claimed relative dimensions would not perform differently than the prior art device, the claimed device was not patentably distinct from the prior art device. There is no evidence that the basic function of the system of Chow et al is affected by variation of channel lengths.

Response to Arguments

12. Applicant's arguments with respect to the claims have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

13. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Dr. Jeffrey T. Barton whose telephone number is (571) 272-1307. The examiner can normally be reached on M-F 9:00AM - 5:30PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nam Nguyen can be reached on (571) 272-1342. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

JTB
3 January 2008

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